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THE MOUNTAIN PINE BEETLE

An update from the Wyoming State Forestry Division

Dear Wyoming State Forestry Division,

I purchased a parcel of land with conifers growing on it. Recently, I heard some folks talking about the mountain pine beetle epidemic. Can you tell me a bit more about this insect and how it is currently affecting trees in Wyoming? Do I need to take steps to protect my trees?

—A concerned landowner

The mountain pine beetle (MPB) belongs to the genus *Dendroctonus*, which translates to "tree killer." Roughly ⅛ to ⅓ an inch in length, the beetle earns this title by landing en masse on susceptible trees, burrowing beneath the outer bark, and severing the nutrient source connection between the roots and the canopy.

Once inside the tree, the beetles lay eggs that develop over winter. In late spring, they leave to find new trees.

In Wyoming, impacted native species include the lodgepole pine, ponderosa pine, limber pine, and high elevation whitebark pine. Since the year 2000, an estimated 25.5 million acres have been impacted by MPB across the western United States.

What is the current MPB status in Wyoming?

By 2016, the mountain pine beetle (*Dendroctonus ponderosae*) epidemic in Wyoming was considered over. Using U.S. Forest Service aerial survey data between 2000 and 2021, more than 2,770,000 acres across the state were impacted by MPB (Figure 1).

Recorded damage peaked in 2009 with 1,080,594 acres recorded (Figure 2). Note that areas could be counted multiple times over the years as new trees died in previously recorded areas. As a result, the estimated number of acres impacted in Wyoming is less than the total sum by year shown in Figure 2.

Most of the time, MPB populations remain low and only a few scattered trees or pockets of mortality are observed across the landscape. This condition, which describes Wyoming's current MPB status, is referred to as an endemic population. When populations are endemic, MPB only have the numbers to overcome the

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defensive capabilities of weakened trees or need freshly killed trees to reproduce.

When conditions are right and large quantities of susceptible trees are present, beetle populations can grow rapidly, resulting in an epidemic and landscape levels of pine mortality in even the healthiest trees.

What happens after a MPB epidemic?

MPB epidemics result in significant changes to a forested landscape. After an epidemic, significant numbers of large, dead pines are present throughout the forest (Figure 3). This impacts tree species diversity, structure diversity, fire behavior, forest health, wildlife behavior, and recreation.

After MPB kills a tree, the needles uniformly fade to a red or straw color (depending on the species) within a year. During this time the trees quickly lose moisture, becoming more flammable. Within three years, these needles will fall from the tree and again alter the potential fire dynamics in the canopy.

Over time, the dead trees will fall to the forest floor and modify stand conditions once again. These large piles of dead logs increase the fuel bed depth and make it more difficult for large ungulates like elk to move around. Falling trees pose an additional risk in high use areas such as trail centers and campgrounds.

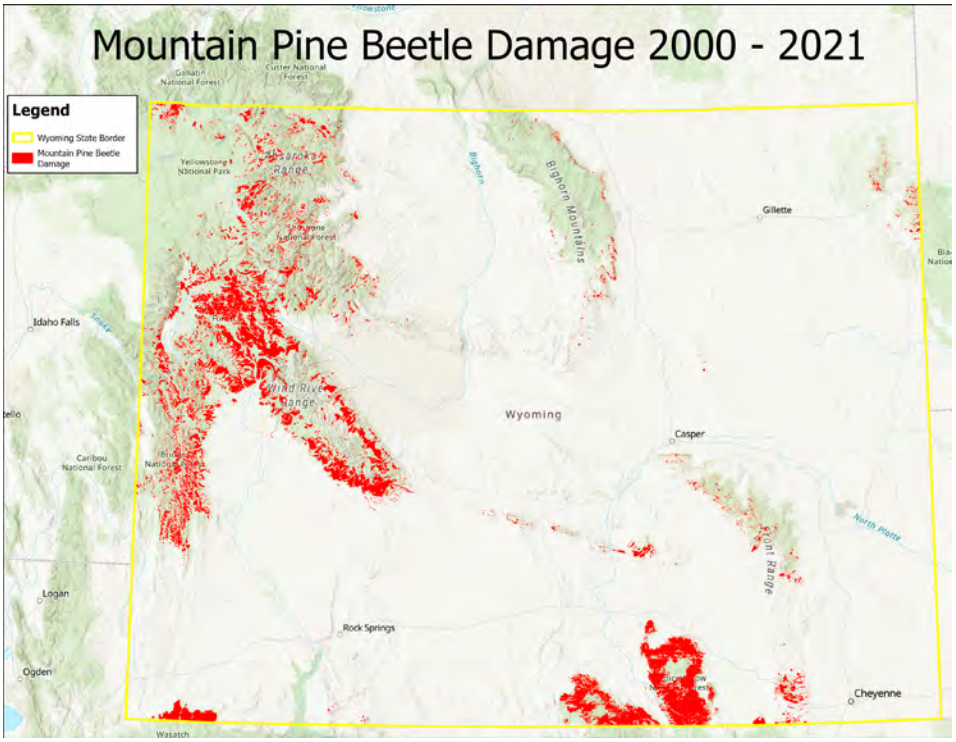

Figure 1: The map above uses data provided by the US Forest Service Aerial Survey Program. Each year forest health professionals fly the majority of forested acres in Wyoming and record current damage agents. The map shows the recorded locations and extent to scale of MPB recorded damage from 2000 – 2021.

Beneficially, fallen trees increase gaps in the tree canopy, allowing more light to reach the forest floor. This promotes tree species regeneration and herbaceous plant growth.

Which forests are currently at risk?

When MPB populations are at endemic levels, only high-risk pine trees are usually susceptible. Forest attributes that put pine trees at high risk for MPB infestation include:

- Overly dense tree stands;
- A stand with a large component of mature pine trees;
- Trees currently stressed by drought, other insects, disease, or wildfire;
- A large nearby event (such as blowdown or wildfire) that results in high levels of pine mortality.

What management strategies are recommended?

During an epidemic, the most effective form of tree protection comes from pesticide use. Sprays are highly effective but costly, and require specialized equipment for proper application. When MPB populations are at endemic levels, active forest management is the better option.

Forest management thinning provides the benefit of increasing a forest's overall resistance and resilience to insects and disease, including MPB and wildfire.

Selective thinning prioritizes the healthier, more vigorous trees and reduces competition for water and nutrients to support their growth.

Healthy trees produce defensive compounds to repel MPB attacks. Trees without adequate moisture and nutrients will produce fewer defensive compounds and as a result will be less likely to repel a MPB attack.

Would my property benefit from active forest management?

Considering the wide range of scenarios based on geographic location, pine species, and risk factors, recommendations should be made by a forester who is either on site or familiar with your area. Recommendations for ponderosa in the Black Hills, for example, differ from those for lodgepole pines near the Medicine Bow National Forest or whitebark pines around Jackson Hole.

Generally, for MPB, if your pine trees are large (more than 10" in diameter at breast height) and you have an additional risk factor from the list above, you should contact a forester.

Wyoming State Forestry Division has foresters throughout the state who can help you assess your forest stands, make recommendations, and create plans to meet your goals. Goals may include increasing timber value, improving forest health, increasing resistance and resiliency to wildfire, or objectives related to wildlife.

To contact a local Wyoming State Forestry Division forester in your area, visit https://bit.ly/wsfd-contacts.

Since the benefits of forest thinning take time to materialize and the nature of forest health threats is unpredictable, a prompt, prudent, and proactive approach is often best. *"An ounce of prevention is worth a pound of cure."*
—Benjamin Franklin

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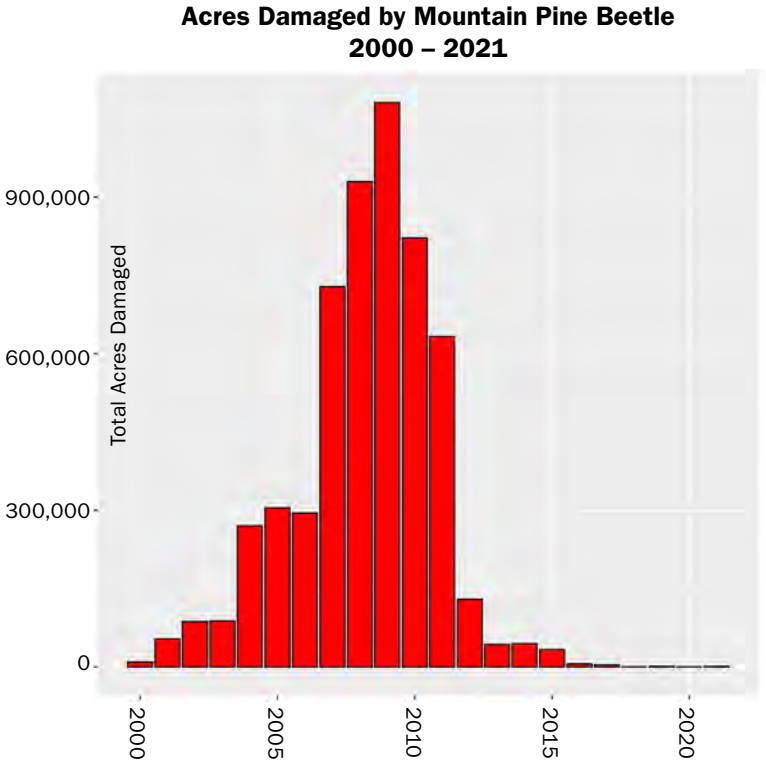
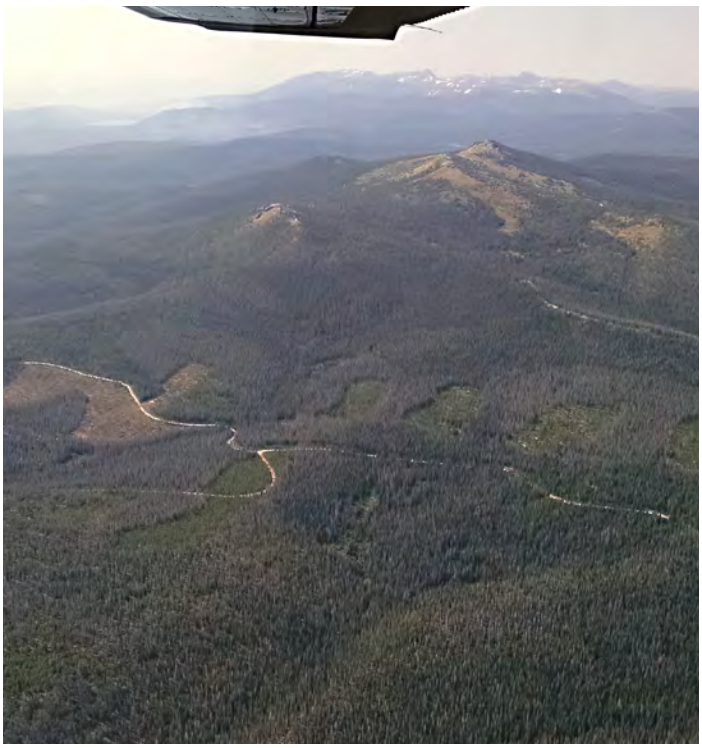


Figure 2: The chart above shows the amount of MPB damage recorded by year in Wyoming.



Ryan DeSantis

Figure 3: Note the widespread, but also patchy nature of MPB damage across a landscape. Photo was taken in 2016 above the Medicine Bow National Forest.